

FALCOM A1

User Manual / Command List

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1. Introduction

1.1. Scope of this document

This document describes the messages exchanged between an external application module and the FALCOM A1 GSM mobile station, based on AT commands in order to control incoming and outgoing calls.

This document presents the AT-commands implemented for the voice call tele-service, the data tele-service and the short message teleservice.

1.2. Get a update

Please send a email to update to update@falcom.de or use the form at <http://www.falcom.de/forms/firmwared.htm>

1.3. Related documents

This interface specification is based on the following recommendations:

(1) ETSI GSM 07.05: European digital cellular telecommunication system (phase 2); Use of DTE-DCE interface for Short message service and cell broadcast service

(2) ETSI GSM 07.07: European digital cellular telecommunication system (phase 2); AT command set for GSM Mobile Equipment

(3) ITU-T Recommendation V.25 ter: Serial asynchronous automatic dialling and control

(4) ETSI GSM 03.38: European digital cellular telecommunication system (phase 2); Alphabets and language-specific information.

1.4. Adresses

European Telecommunications Standards Institute

Secretariat

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Tel: (+33) 92 94 42 00 Fax (+33) 93 65 47 16

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<http://www.etsi.fr>

1.5. Definitions

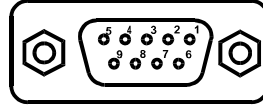
In the GSM vocabulary, a call from GSM mobile to the Network is named “mobile originated call” or „outgoing call“, and a call from fixed network to a GSM mobile is called „mobile terminated call“ or „incoming call“.

1.6. Technical Data

- * **Dimensions:** B x H x T 115mm x 54mm x 33mm
- * **Weight:** 130g
- * **Power Supply:** 10,8...31,2 V/DC (worst case, including application board on basis DS 87C520/PLCC44)
 - 325 mA transmit mode 10,8V
 - 47 mA idle mode 10,8V
 - 110 mA transmit mode 31,2V
 - 25 mA idle mode 31,2V
- * **Temperature Range:** Storage: -20°C to +70°C
Use: -20°C to +55°C

- * **Interface A:** Antenna 50Ω FME Male
- * **Interface B:** RS232 / V24 9 pin D-Sub to DIN 41652

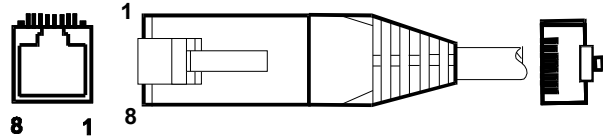
pin 1 DCD
 pin 2 TXD
 pin 3 RXD
 pin 4 DTR
 pin 5 SND
 pin 6 DSR
 pin 7 RTS
 pin 8 CTS
 pin 9 RI



This interface is the master and is connected to the GSM-module, when RTS is active. Under this status the LED line is switched off, only power on is displayed.

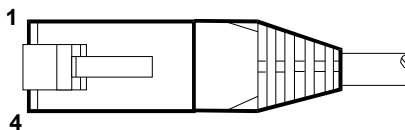
- * **Interface C:** RJ 45 8 pin shielded for hand set, RX, TX, Power and ground (RX and TX are not connected by FALCOM A1-1).

pin 1 10,8-31,2V / 6V / 5V (option)
 pin 2 RXD
 pin 3 TXD
 pin 4 GND
 pin 5 SPK +
 pin 6 SPK -
 pin 7 MIC +
 pin 8 MIC -



- * **Interface D:** Power supply

pin 1 withe 10,8 .. 31,2V
 pin 2 yellow Option
 pin 3 green NC
 pin 4 brown GND



- * **SIM-Card interface:** for small SIM-Cards
- * **Digital interface:** V24 (9 pole D-Sub)
 V28
 AT-commands according to GSM 0707 /

0705

Extended AT-commands List

- * **Data communication:** asynchronous, transparent and not transparent

GSM 07.01, 07.02, 04.21

- 2400 BPS V22 bis
- 2400 BPS V26 ter
- 4800 BPS V32
- 9600 BPS V32
- 2400 BPS V110
- 4800 BPS V110
- 9600 BPS V110

Routes:	MOC and MTC
INFO transf. mode: or UDI/V.110 (ISDN)	3,1Khz audio ex PLMN (analogue)
Clock mode:	Asynchronous
Connection elem.:	Transparent/Non Transparent
Structure:	Unstructured/Structured
Layer 2 protocol:	NAV
Data bits:	8
Parity bits:	None
Bits/char.:	Always 10 bits/char.
Stop bits:	1
Radio channel:	Full rate
Intermed. rate:	16 kbit/s
User rate:	2400, 4800 or 9600 bit/s
Modem type:	V.22bis, V.26ter, Auto-baud, V.32
Bearer service:	BS 24, BS 25, BS 26

* **Short Message Service:** GSM 03.40, 07.05

- SMS mobile originated
- SMS mobile terminated
- CBS Text mode /PDM mode
7 bit user data / 8 bit user data

Routes:	SMS MO and MT
MODE:	Text mode, PDU, 7/8 bits user data
Teleservice:	TS22, TS21

* **Fax:**

Group 3 /Class I	
CCITT Rec.:	CCITT T.30, T.4
Routes:	MOC and MTC
Info. transf. mode:	Synchronous
Connection elem.:	Transparent
Structure:	Unstructured
Radio channel:	Full rate

Intermed. rate:	16kbit/s
User rate:	2400,4800 or 9600 bit/s
Teleservice:	TS 62

* **Audio interface:**

- Electret-Microphone
- loudspeaker 150Ω
- Power 6V regulated DC
- ground
- shield

2. AT commands features

2.1. FALCOM A1 line settings

Currently, the FALCOM A1 serial line is set to 9600 bps, 8 bits data, 1 bit stop, no parity, RTS/CTS flow control. Please use the commands +IPR, +IFC, +ICF to change these settings.

2.2. Command line

Commands always finish with <CR>.

2.3. Information responses and result codes

Responses always start with <CR><LF> and end with <CR><LF>.

- If the syntax command is wrong, the string **ERROR** is sent.
- If the syntax command is correct but with some incorrect parameters, the string **+CME ERROR: <err>** is sent with different error codes.
- If the command line has been performed successfully, the string **OK** is sent.

Please note that in the some cases like "AT+CPIN?", "AT+EXPKEY?", incoming events etc... the mobile does not finish its response with the string **OK**.

In the following examples <CR> and <CR><LF> will be intentionally omitted.

3. AT commands for Call Control

3.1. Dialing command D

This AT command is used by the external application to establish a call.

For a data call, the application sends to the GSM module the following ASCII string : (the bearer has to be selected before with the +CBST command)

ATD<nb>; where <nb> is the called phone number.

For a voice call, the application sends to the GSM module the following ASCII string : (the bearer may be selected before, if not a default bearer is used)

ATD<nb>; where <nb> is the called phone number.

The answer to the command is the following :

Verbose result code	Numeric (V0 set)	Description
OK	0	if the call succeeds, for voice call only
CONNECT <speed>	10,11,12,13,14,15	the call succeeds, for data call only, <speed> takes the value negotiated by the GSM module
BUSY	7	if the called party is in communication
NO ANSWER	8	if no hang up is detected after a fixed network time-out

Please, notice that in case of international number, the local international prefix has not to be set (usually 00) but need to be replaced by the '+' character.

Example : to establish a voice call to FUNKANLAGEN LEIPOLDT OHG from another country, the AT command shall be :

ATD+49367780420

Notice that some country can have particular numbering rules for their GSM handset numbering.

Direct dialling from a phonebook location (stored in SIM card) be done with the following command:

ATD>17; or AD>SIM17; (voice call here)

ATD>"Fred"; for calling "Fred" from the phonebook

3.2. Hang-Up command H

This command is used by the application to disconnect the remote user.
The application sends :

Application to GSM	ATH	<i>ask for disconnection</i>
GSM to application	OK	<i>even if there is no communication established</i>

3.3. Answer a call A

When the GSM module receives a call, it set the RI signal and sends to the application the ASCII string RING. Then it waits for the application to accept the call.

Application to GSM	ATA	
GSM to application	OK	<i>Normal case</i>
Application to GSM	ATA	
GSM to application	NO CARRIER	<i>if ATA is sent when no incoming call was indicated (operation not allowed)</i>

3.4. Incoming Call Bearer +CICB

This command is used for incoming call type when no bearer is given.
The supported modes are: 0 for data, 1 for fax and 2 for a speech call.

Application to GSM	AT+CICB=1	<i>If no incoming bearer, it is a fax call</i>
GSM to Application	OK	<i>Command accepted</i>
Application to GSM	AT+CICB=2	<i>If no incoming bearer, it is a speech call</i>
	OK	<i>Command accepted</i>

3.5. Remote disconnection

This message is used by the GSM module to indicate to the application that the communication has been released by the remote user.

The GSM module sends "NO CARRIER" to the application, and set the DCD signal.

3.4. DTMF signals +VTD, +VTS

The GSM module offers the user application to send DTMF tones. One command shall be used for defining the duration of the tones (default value is 70 ms), the other for sending the Tones.

For defining the duration, the application uses :

AT+VTD=<n> where <n>*100 gives the duration in ms.

Application to GSM	AT+VTD=1	for defining 100 ms tone duration
GSM to application	OK	Command valid
Application to GSM	AT+VTD=100000	
GSM to application	+CME ERROR: 3	if the duration is too long (the limit is to define for each application)
Application to GSM	AT+VTD=0	for setting the manufacturer default value
GSM to application	OK	

For sending DTMF tones, the application uses :

AT+VTS=<Tone> where <Tone> is in {0-9,*,#,A,B,C,D}

Application to GSM	AT+VTS=A	
GSM to application	OK	Command valid
Application to GSM	AT+VTS=11	
GSM to application	+CME ERROR: 4	If the <Tone> is wrong
Application to GSM	AT+VTS=4	
GSM to application	+CME ERROR: 3	If there is no communication

Example : to send the Tone sequence 13#, the application shall send :

AT+VTS=1	and then wait for
OK	
AT+VTS=3	and then wait for
OK	
AT+VTS=#	and then wait for
OK	

3.5. Operator selection +COPS

To select the operator, two possibilities exist :

The mobile enters the manual mode, and then try to find an operator which is indicated by the application. If it finds and registers correctly, then the mobile stays in idle mode.

The mobile enters the automatic mode, and then try to find the home operator. If it finds and registers correctly, then the mobile stays in idle mode ; if not, the mobile looks itself automatically for another network.

To force an attempt to select and register a GSM network operator, the application must send the following command :

AT+COPS=<mode>, <format>, <oper>

The first parameter indicates either automatic (value 0) or manual (value 1). The second parameter indicates the format of the third parameter. The only format supported by FUNKANLAGEN LEIPOLDT OHG module is the numerical format (value 2). The third parameter is the operator identifier (MCC3 MCC2 MCC1 MNC2 MNC1).

Application to GSM	AT+COPS?	<i>ask for current plmn</i>
GSM to application	+COPS: 0,2, OK	<i>Home plmn is</i>
Application to GSM	AT+COPS=?	<i>ask for plmn list</i>
GSM to application	+COPS: (2), (0 OK	<i>Home plmn is DeTeMobil Mannesmann Mobilfunk network has been seen</i>
Application to GSM	AT+COPS=1,2,20810	<i>ask for registration on network</i>
GSM to application	+CME ERROR: 3	<i>failed</i>
Application to GSM	AT+COPS=1,1,20810	<i>ask for registration on network</i>
GSM to application	+CME ERROR: 4	<i>wrong parameters</i>
Application to GSM	AT+COPS=0,2	<i>ask for registration on home network</i>
GSM to application	OK	<i>succeeded</i>

3.6. Redial last number ATDL

This command is used by the application to redial the last number used in the command ATD. The application sends :

Application to GSM	ATDL	<i>redial last number</i>
GSM to application	0146290800 OK	<i>last call was a speech call command valid</i>

3.7. Signal Quality +CSQ

This command shall be used by the application to know the received signal strength indication <rss> and channel bit error rate <ber>.

<rss>:

0-113 *dBm or less*
 1-111 *dBm*
 2...30 *-109... – 53 dBm*
 31 -51 *dBm or greater*
 99 *not know or not detectable*

<ber> (in percent):

0...7 as RXQUAL values in the table in GSM 05.08 [20] subclause 8.2.4

99 not known or not detectable

Application to GSM	AT+CSQ	
GSM to application	+CSQ: <rss>,<ber> OK	<rss> and <ber> as defined in the GSM TS 07 07

3.8. Network registration +CREG

This command is used by the application to know the registration status of the mobile.

<mode>

0: Disable network registration unsolicited result code

1: Enable network registration code result code +CREG: <stat>

<stat>

0: not registered, ME is not currently searching a new operator

1: registered, home network

2: not registered, ME currently searching a new operator to register to

3: registration denied

4: unknown

5: registered, roaming

Application to GSM	AT+CREG?	
GSM to application	+CREG: <mode>,<stat> OK	<i>as defined in the GSM TS 07 07</i>
Application to GSM	AT+CREG=<mode>	<i>Disable/enable network registration unsolicited result code</i>
GSM to application	OK	<i>command valid</i>

3.9. Automatic answer ATS0

This S-parameter controls the automatic answering feature of the mobile.

Application to GSM	ATS0=2	<i>automatic answer after 2 rings</i>
GSM to application	OK	
Application to GSM	ATS0?	<i>Current value</i>
GSM to application	002 OK	<i>always 3 characters with leading zeros</i>
Application to GSM	ATS0=0	<i>no automatic answer</i>
GSM to application	OK	<i>command valid</i>

3.10. Audio gain control +VGR, +VGT

This command shall be used by the application to tune the receive gain of the speaker and transmit gain of the microphone. The application shall send

AT+VGR=<val>	For the gain	AT+VGT=<val>	for the transmit gain
0 to 15	+6 db	0 to 31	+14 db
16 to 31	+4 db	32 to 63	+17 db
32 to 47	+2 db	64 to 95	+20 db
48 to 63	0 db	96 to 127	+23 db
64 to 79	-2 db	128 to 159	+26 db
80 to 95	-4 db	160 to 191	+29 db
96 to 111	-6 db	192 to 223	+32 db
112 to 127	-8 db	224 to 255	+35 db
128 to 143	-10db		
144 to 159	-12 db		

160 to 175	-14 db
176 to 191	-16 db
192 to 207	-18 db
208 to 223	-20db
224 to 239	-22 db
240 to 255	-24 db

16 levels for receive gain are provided and 8 levels for transmit gain.

Application to GSM	AT+VGR=25	
Application to GSM	AT+VGR=25	
GSM to application	OK	Command valid
Application to GSM	AT+VGT=45	
GSM to application	OK	Command valid

3.11. SideTone modification **+SIDET**

The syntax of the command is:
AT+SIDET=<val1>. <val2>

This command is used to get an echo of the voice in the speaker (to hear what is said in the speaker).

<val2>	level	<val1>	Presence
0	0 db	0	SideTone is disabled
1	- 6db	1	SideTone is enabled
2	- 12db		
3	- 18 db		

Application to GSM	AT+SIDET=1,0	
GSM to application	OK	Command valid
Application to GSM	AT+SIDET?	Current value
GSM to application	+SIDET: 1,0 OK	Command valid

3.12. Echo canceler **+ECHO**

The syntax of the command is:

AT+ECHO=<val1>,<val2>

This command is used for car kit applications to reduce the echo effects than can occur in a car.

<val2>	attenuation	<val1>	Presence
0	- 18db	0	Echo is disabled
1	- 24db	1	Echo is enabled
2	- 30 db		
3	- 36db		

Application to GSM	AT+ECHO=1,0	
GSM to application	OK	Command valid
Application to GSM	AT+ECHO?	Current value
GSM to application	+ECHO: 1,0 OK	Command valid

4. AT commands SIM, E2prom

4.1. Product Serial Number +CGSN

This command allows the user application to know the IMEI of the GSM module. The application sends :

Application to GSM	AT+CGSN	<i>get IMEI</i>
GSM to application	135790248939 OK	<i>IMEI present in E2PROM</i>
Application to GSM	AT+CGSN	<i>get IMEI</i>
GSM to application	+CME ERROR: 22	<i>IMEI not found in E2PROM</i>

4.2. Request model identification +CGMM

This command is used to get the hardware version.

Application to GSM	AT+CGMM	<i>get hardware version</i>
GSM to application	GSM P 900 OK	<i>command valid</i>

4.3. Request revision identification +CGMR

This command is used to get the software version.

Application to GSM	AT+CGMR	<i>get software version</i>
GSM to application	276 OK	<i>command valid</i>

4.4. Manufacturer identification +CGMI

This command gives the manufacturer identification.

Application to GSM	AT+CGMI	<i>get manufacturer identification</i>
GSM to application	FUNKANLAGEN LEIPOLDT OHG OK	<i>command valid</i>

4.5. Capabilities list +GCAP

This command gives the complete capabilities list.

Application to GSM	AT+GCAP	<i>get capabilities list</i>
GSM to application	+CGSM OK	<i>supports GSM commands and FAX</i>

4.6. Phone activity status +CPAS

This command returns the activity status of the mobile.

Application to GSM	AT+CPAS	<i>Current activity status</i>
GSM to application	+CPAS: "x" OK	<i><pas> can have the following values 0: ready (allow commands from TA/TE) 1: unavailable (does not allow cmds) 2: unknown 3: ringing (ringer is active) 4: call in progress 5: asleep (low functionality)</i>

4.7. Power off +CPOF

This command stops the GSM software stack and then the hardware layer.

Application to GSM	AT+CPOF	<i>Stop GSM stack</i>
GSM to application	OK	<i>command valid</i>

4.8. Set phone functionality +CFUN

This command selects the level of functionality in the mobile station.

- When the application wants to stop the module for making a power off, or if the application wants to force the module for executing a IMSI DETACH procedure, then it has to send :

AT+CFUN=0

This command executes a IMSI DETACH and makes a backup of some internal parameters in the SIM and the EEPROM.

If the mobile is not powered off after this command, it shall received another command to re-start the whole GSM process.

If the mobile is turned off after this command, then the power on will automatically execute the start of the whole GSM process.

- When the application wants to re-start the module (after having done a AT+CFUN=0 command, and without having cut the power supply), it has to send :

AT+CFUN=1,1

This command starts again all the GSM stack and GSM functionality.

Application to GSM	AT+CFUN?	<i>ask for current functionality</i>
GSM to application	+CFUN: "x" OK	<i>"x" as defined in the GSM TS 07 07</i>
Application to GSM	AT+CFUN=0	<i>set minimum functionality</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CFUN=1	<i>set full functionality</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CFUN=1,0	<i>set full functionality without reset</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CFUN=1,1	<i>set full functionality with reset</i>
GSM to application	OK	<i>command valid</i>

4.9. Enter PIN/PUK code +CPIN

This command is used to validate the PIN code, or to validate the PUK code (and define a new PIN code).

The PIN length is between 4 and 8 digits, the PUK length is 8 digits only.

If the user application try to establish an outgoing call before having validated the SIM PIN code, then the GSM module will refuse the "ATD" command with a "+CME ERROR: 11" (SIM PIN required).

It's up to the application to validate the PIN after each reset or power on. The application shall therefore use the command :

AT+CPIN="<pin>"

Application to GSM	AT+CPIN=1234	<i>enter PIN</i>
GSM to application	OK	<i>PIN correct</i>
Application to GSM	AT+CPIN=5678	<i>enter PIN</i>
GSM to application	+CME ERROR: 16	<i>Operation not allowed, PIN previously entered</i>

After 3 unsuccessful codes, the PUK will then be required. The PUK validation forces the user to enter as a second parameter a new PIN code which will be the future PIN code if the PUK validation succeeds. The application shall therefore use the command :

AT+CPIN="<puk>","<new pin>"

Application to GSM	AT+CPIN=00000000,1234	<i>enter PUK and new PIN</i>
GSM to application	OK	<i>PUK correct, new PIN stored</i>
Application to GSM	AT+CPIN=12345678,1234	<i>enter PUK and new PIN, 2nd attempt</i>
GSM to application	+CME ERROR: 16	<i>incorrect PUK</i>

To know which code has to be entered (or not), the following interrogation command will be implemented :

AT+CPIN?

The possible responses are :

+CPIN: READY	No PIN is needed
+CPIN: SIM PIN	PIN is required
+CPIN: SIM PUK	PUK is required
+CME ERROR: <err>	SIM failure (13),absent (10) etc...

The state "SIM PIN" is entered only when PIN is enabled and

Please note that in this case the mobile does not finish its response with the OK string.

The response +CME ERROR: 13 (SIM failure) is returned after 10 unsuccessful PUK presentations. The SIM card is then out of order and shall be replaced by a new one.

Example : 3 failed PIN validations + 1 successful PUK validation

AT+CPIN? +CPIN: SIM PIN	Read the PIN status The GSM module requires SIM PIN
AT+CPIN="1235" +CME ERROR: 16	First attempt to enter a SIM PIN Bad PIN
AT+CPIN="1236" +CME ERROR: 16	Second attempt bad PIN
AT+CPIN="1237" +CME ERROR: 16	Third attempt bad PIN
AT+CPIN? +CPIN: SIM PUK	Read PIN state the GSM module requires PUK
AT+CPIN="99999999","5678" OK	the PUK is entered, the new PIN shall be 5678 PUK validation is OK. New Pin is 5678
AT+CPIN? +CPIN: READY	Read PIN state GSM module is ready

4.9.1. Remark

In the way Application to GSM, an "h" character shall be added before the PIN value if ciphering mode (with D.E.S algorithm) is on. See +EXPKEY command.

Same remark for +CLCK and +CPWD commands.

4.10. Facility lock +CLCK

The syntax of this command is: +CLCK=<fac>,<mode>[<passwd>]

This command shall be used by the application to change a facility status, with the following <fac> values:

"PS" : SIM lock facility with a 8 digits password.

"SC" : PIN enable (<mode>=1)/disable (<mode>=0)

"AO" : BAOC (Barr All Outgoing Calls)

"OI" : BOIC (Barr Outgoing International Calls)

"OX" : BOIC-exHC (Barr Outg. Intern. Calls exept to Home Country)

“AI” : BAIC (Barr All Incoming Calls)

“IR” : BIC-Roam (Barr Inc. When Roaming outside Home Country)

“AB” : All Barring services (only with <mode>=0)

“AG” : All outGoing barring services (only with <mode>=0)

“AC” : All inComing barring services (only with <mode>=0)

“WNL” : Network lock with a 8 digits password (NCK)

<mode>

0 : unlock the facility

1 : lock the facility

The password length is given with the AT+CPWD=? command.

Application to GSM	AT+CLCK="SC",1,1234	<i>enable PIN</i>
GSM to application	OK	<i>PIN iwas good</i>
Application to GSM	AT+CLCK?	<i>Read PIN status</i>
GSM to application	+CLCK: ("PS", 0), ("SC", 1), ("AO", 0), ("OI", 0), ("OX", 0), ("AI", 0), ("IR", 0), ("AB", 0), ("AG", 0), ("AC", 0), ("WNL", 0) OK	<i>PIN is enabled, all other facilities are disabled</i>
Application to GSM	AT+CLCK="SC",0,5555	<i>disable PIN</i>
GSM to application	+CME ERROR: 16	<i>PIN was wrong</i>
Application to GSM	AT+CPIN=1234	<i>Enter PIN</i>
GSM to application	OK	<i>PIN was good</i>
Application to GSM	AT+CLCK= ?	<i>request supported facilities</i>
GSM to application	+CLCK : ("PS","SC","AO","OI", "OX", "AI", "IR","AB", "AG","AC", "WNL") OK	<i>supported facilities</i>
Application to GSM	AT+CLCK="WNL",1,12345678	<i>Activate network lock</i>
GSM to application	OK	<i>Network lock activated</i>

“+CME ERROR: 30” is returned if the network replied with an error case (No network service)

4.11. Change password +CPWD

This command shall be used by the application to change a password(PIN call barring, NCK...). The facility values are the same as for +CLCK command.

For the network lock ("WNL"), the unlock is forbidden after 10 failed attempts to disable (unlock) the network lock with an incorrect password.

Application to GSM	AT+CPWD=?	Possible values
GSM to application	+CPWD: ("PS", 8),("SC", 8),("AO", 4), ("OI", 4), ("OX", 4),("AI", 4),("IR", 4), ("AB", 4), ("AG", 4), ("AC", 4), ("WNL", 8) OK	PIN must be on 8 digits maximum
Application to GSM	AT+CPWD="SC",1234,5555	change PIN
GSM to application	OK	PIN was good
Application to GSM	AT+CPWD="SC",1234,5555	Change PIN
GSM to application	+CME ERROR: 16	PIN was wrong
Application to GSM	AT+CPIN=5555	Enter PIN
GSM to application	OK	PIN was good
Application to GSM	AT+CPWD="WNL",12345678, 00000000	change NCK
GSM to application	OK	NCK changed for net lock

4.12. Select phonebook memory storage +CPBS

This command selects phonebook memory storage. The only available phonebook is the SIM phonebook ("SM")

Application to GSM	AT+CPBS="SM"	Selected memory is in SIM
GSM to application	OK	SIM phonebook is selected
Application to GSM	AT+CPBS=?	Possible values
GSM to application	+CPBS: ("SM") OK	SIM phonebook supported
Application to GSM	AT+CPBS ?	Status
GSM to application	+CPBS : "SM",10,20 OK	SIM phonebook selected, 10 used locations, 20 locations

4.13. Read phonebook entries +CPBR

This command returns phonebook entries for a location range from the current phonebook memory storage selected with +CPBS.

Application to GSM	AT+CPBR=?	<i>Test command</i>
GSM to application	+CPBR: (1-50), 20,10 OK	<i>50 locations (from 1 to 50), max length of 20 for phone 10 characters max for the associated text</i>
Application to GSM	AT+CPBR=12,14	<i>Read entries from 12 to 14</i>
GSM to application	+CPBR : 12,"112",129,"Emergency" +CPBR : 13,"+49367780420", 145"FALCOM" +CPBR : 14,"0146290808", 129,"Zazi" OK	<i>Display locations 12,13,14 with Location, Number, Type, Text</i>
Application to GSM	AT+CPBR=10	<i>Read entry 10</i>
GSM to application	+CPBR :10,"0146290921",129,"Rob" OK	<i>Display location 10</i>
Application to GSM	AT+CPBR=52	<i>Read entry 52 (wrong)</i>
GSM to application	+CME ERROR: 21	<i>Invalid index</i>

4.14. Find phonebook entries +CPBF

This command returns phonebook entries with alphanumeric field start with a given string. The AT+CPBF="" command can be used to display all phonebook entries sorted in alphabetical order.

Application to GSM	AT+CPBF=?	<i>Test command</i>
GSM to application	+CPBF: 20,10 OK	<i>max length of 20 for phone 10 characters for the text</i>
Application to GSM	AT+CPBF="E"	<i>Read entries with "E"</i>
GSM to application	+CPBF: 12,"112",129,"Emergency" +CPBF: 5,"+49367780420",145,"Eric" OK	<i>Display locations with text field starting with "E"</i>
Application to GSM	AT+CPBF="H"	<i>Read entries with "H"</i>
GSM to application	+CME ERROR: 22	<i>Entry not found</i>

4.15. Write phonebook entry +CPBW

This command writes phonebook entry in location number *<index>* in the current phonebook memory storage.

Application to GSM	AT+CPBW=?	<i>Test command</i>
GSM to application	+CPBW: (1-50),20,(129,145),10 OK	<i>50 locations, phone length=20, TON/NPI of 129 or 145, text length=10</i>
Application to GSM	AT+CPBW=3	<i>Erase location 3</i>
GSM to application	OK	<i>Location 3 erased</i>
Application to GSM	AT+CPBW=5,"112",129,"SOS"	<i>Write at location 5</i>
GSM to application	OK	<i>Location 5 written</i>
Application to GSM	AT+CPBW=5,"01290917",129,"Jacky"	<i>Overwrite location 5</i>
GSM to application	OK	<i>Location 5 is overwritten</i>
Application to GSM	AT+CPBW=,"+49145221100",145,"SO S"	<i>Write at the first free location</i>
GSM to application	OK	<i>Free location is written</i>
Application to GSM	AT+CPBW=,"0345221100",129,"SOS"	<i>Write at the first free location</i>
GSM to application	+CME ERROR: 20	<i>Phonebook full</i>
Application to GSM	AT+CPBW=57,"112",129,"WM"	<i>Write at loc 57 (wrong)</i>
GSM to application	+CME ERROR: 21	<i>Invalid index</i>
Application to GSM	AT+CPBW=7,"0123456789012345678 90",129,"FAL"	<i>Write at loc 7 a long Phone number (21 digits)</i>
GSM to application	+CME ERROR: 26	<i>Phone too long</i>
Application to GSM	AT+CPBW=7,"0122334455",129,"LEI POLDT"	<i>Write at loc 7 a long Text (11 characters)</i>
GSM to application	+CME ERROR: 24	<i>Text too long</i>

4.16. Advice of charge +CAOC

Syntax of this command: AT+CAOL= <mode>

This refers to Advice of Charge supplementary service (GSM 02.24 and GSM 02.86) that enables subscriber to get information about the cost of calls. With the execute command returns the current call meter value (CCM) from the ME.

If AOC is supported, the command also includes the possibility to enable an unsolicited event reporting of the CCM information. The unsolicited result code is sent when the CCM value changes. Deactivation of the unsolicited event reporting is made with the same command.

If AOC is supported, the Read command indicates whether the unsolicited reporting is activated or not.

Defined values

<mode>:

- 0 query CCM value
- 1 deactivate the unsolicited reporting of CCM value
- 2 activate the unsolicited reporting of CCM value

<ccm>: string type; three bytes of the current call meter value in hexadecimal format (e.g. "00001E" indicates decimal value 30); value is in home units and bytes are similarly coded as ACMmax value in the SIM

Application to GSM	AT+CAOC=0	<i>Query CCM value</i>
GSM to application	+CAOC : "000A08" OK	<i>Display Current Call Meter value (CCM = 2568)</i>
Application to GSM	AT+CAOC=1	<i>Deactivate unsolicited report of CCM value</i>
GSM to application	OK	<i>CCM report deactivated</i>
Application to GSM	AT+CAOC=2	<i>Activate unsolicited report of CCM value</i>
GSM to application	OK	<i>CCM report activated</i>
Application to GSM	AT+CAOC ?	<i>Request mode</i>
GSM to application	+CAOC : <mode> OK	<i>Display unsolicited report mode (1 or 2)</i>
Application to GSM	AT+CAOC= ?	<i>Request supported modes</i>
GSM to application	+CAOC : (0-2) OK	<i>0,1,2 modes supported</i>

4.17. Accumulated call meter +CACM

The syntax of this command is: AF+CACM="PIN"

Set command resets the Advice of Charge related accumulated call meter value in SIM file EF_{ACM}. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is required to reset the value. If setting fails in an ME error is returned.

Read command returns the current value of ACM. The ACM value is in hexadecimal format with 6 digits.

Application to GSM	AT+CACM ?	<i>Request ACM value</i>
GSM to application	+CACM : "000400" OK	<i>Display ACM value (ACM = 1024)</i>
Application to GSM	AT+CACM= 1234	<i>Request ACM reset, real PIN2 is "1234"</i>
GSM to application	OK	<i>ACM value is reset</i>
Application to GSM	AT+CACM= 0000	<i>Request ACM reset with wrong PIN2 value</i>

GSM to application	+CME ERROR : 17	<i>SIM PIN2 required</i>
Application to GSM	AT+CACM ?	<i>Request ACM value</i>
GSM to application	+CACM : "000000" OK	<i>Display ACM value (ACM = 0)</i>

4.18. Accumulated call meter maximum +CAMM

The syntax of this command is: AT+CAMM="ACMmax" "<pin">

Set command sets the Advice of Charge related accumulated call meter maximum value in SIM file EF_{ACMmax}. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM reaches ACMmax, then calls are prohibited. SIM PIN2 is required to set the value. If setting fails in an ME error is returned.

Read command returns the current value of ACMmax.

The ACMmax value (entered or displayed) is in hexadecimal format with 6 digits. When updating ACMmax value, ACM is automatically reset.

Application to GSM	AT+CAMM= "000400", 1234	<i>Request ACMmax update, real PIN2 is "1234"</i>
GSM to application	OK	<i>ACMmax updated to 1024</i>
Application to GSM	AT+CAMM= "000400",0000	<i>Request ACMmax update, real PIN2 is "1234"</i>
GSM to application	+CME ERROR : 17	<i>SIM PIN2 required</i>
Application to GSM	AT+CAMM ?	<i>Request ACMmax value</i>
GSM to application	+CAMM : "000400" OK	<i>ACMmax=1024</i>

4.19. Price per unit and currency table +CPUC

Set command sets the parameters of Advice of Charge related price per unit and currency table in SIM file EF_{PUCT}. PUCT information can be used to convert the home units (as used in into currency units. SIM PIN2 is required to set the parameters. If setting fails in an ME error is returned.

Application to GSM	AT+CPUC= "FFR", "0.82", 1234	<i>Request Currency and Price per unit update</i>
GSM to application	OK	<i>ACMmax updated to 1024</i>
Application to GSM	AT+CPUC= "FFR", "0.82", 1111	<i>Request Currency and PPU update (wrong PIN2)</i>
GSM to application	+CME ERROR : 17	<i>SIM PIN2 required</i>
Application to GSM	AT+CPUC?	<i>Request Currency & Price</i>
GSM to application	+CPUC: "FFR", "0.82" OK	<i>Currency= "FFR" Price per unit= "0.82"</i>

5. AT commands for short messages

We recommend the GSM 07.05 from the ETSI in France, because there is a lot of information about the SMS handling in the GSM networks in.

5.1. Parameters definition

<da> is the destination address.

<dc> is the data coding scheme and is coded like in document [5].

<dt> is the discharge time.

<fo> is coded like first octet of SMS-SUBMIT in document [4].

<index> is the place of storage in memory.

<length> is the number of characters in text mode or the length of data binary string in PDU mode.

<mr> is the message reference.

<oa> is the originator address.

<pid> is the protocol identifier.

<pdu> is the binary string coded as specified in document [4]

<ra> is the recipient address.

<sca> is the address of the service center.

<scts> is the service center time stamp.

<st> is the status.

<stat> is the status of message in memory.

<tooa> is the integer format of <oa>.

<tora> is the integer format of <ra>.

<tosca> is the integer format of <sca>.

<vp> is the validity period of the message.

5.2. Select message service +CSMS

The supported services are GSM originated and terminated short message services (SMS-PP), and the cell broadcast service (SMS-CB).

Application to GSM	AT+CSMS?	<i>Current service</i>
GSM to application	+CSMS: 0, 1, 1, 0 OK	<i>GSM 03.40 et 03.41, SMO and SMT supported, SMCB not supported</i>
Application to GSM	AT+CSMS=?	<i>Possible service</i>
GSM to application	+CSMS: (0) OK	<i>Only GSM 03.40 et 03.41 is possible</i>

5.3. Preferred Message Storage +CPMS

The incoming messages are automatically stored in the SIM.

Application to GSM	AT+CPMS?	<i>Read it</i>
GSM to application	+CPMS: "SM", 3, 10 OK	<i>3 messages are stored in SIM. 10 is the total available SIM memory.</i>
Application to GSM	AT+CPMS=?	<i>Possible storage</i>
GSM to application	+CPMS: "SM" OK	<i>Only SIM is possible</i>

5.4. Preferred Message Format +CMGF

The formats implemented are the text mode and the PDU mode.

In PDU mode, a complete SMS Message including all header information is passed as a binary string (`0`...`9`, `A`...`F`). Each pair or characters is converted to a byte (ex: `41` is converted to the ASCII character `A`, whose ASCII code is 0x41 or 65).

In Text mode, every commands and responses are in ASCII characters.

The chosen format is stored in E2PROM by the command +CSAS.

Application to GSM	AT+CMGF ?	<i>current message format</i>
GSM to application	+CMGF: 1 OK	<i>Text mode</i>
Application to GSM	AT+CMGF=?	<i>Possible message format</i>
GSM to application	+CMGF: (0-1)	<i>Text or PDU modes are</i>

	OK	<i>available</i>
--	----	------------------

Example to send a SMS Message in PDU mode

Application to GSM	AT+CMGF=0	<i>PDU message format</i>
GSM to application	OK	<i>PDU mode valid</i>
Application to GSM	AT+CMGS=14<CR>01F60691214365000004C9E9340B	<i>Send complete SM (14 bytes) in PDU mode</i>
GSM to application	+CMGS: 246 OK	<i>MSG correctly sent</i>

14 is the length of octets of the PDU buffer coded as GSM 03.40 . In this case this buffer is 0x01 0xF6 0x06 0x91 0x21 0x43 0x65 0x00 0x00 0x04 0xC9 0xE9 0x34 0x0B which means regarding to GSM 03.40 :

TP-MIT: 0x01 (SMS-SUBMIT)

<mr>: 0xF6 (Message Reference)

<da>: 0x06 0x91 0x21 0x43 0x65 (+123456)

<pid>: 0x00 (Protocol Identifier)

<dc>: 0x00 (Data coding scheme : 7 bits alphabet chosen)

TP-UDL: 0x04 (User data length)

TP-UD: 0xC9 0xE9 0x34 0x0B (User data : ISSY)

TPDU in hexadecimal format must be converted into two ascii characters. E.G octet with hexadecimal value 0x2A is presented to the mobile as two characters '2' (ascii 50) and 'A' (ascii 65).

5.5. Save settings +CSAS

All settings specified in command +CSCA, +CMGF, +CSMP, +CNMI, +CSDH are stored in E2PROM if the SIM card is phase 1 or in the SIM card if this one is phase 2.

Application to GSM	AT+CSAS	<i>Store</i>
GSM to application	OK	<i>command correct</i>

5.6. Restore settings +CRES

All settings specified in command +CSCA, +CMGF, +CSMP, +CNMI, +CSDH are restored from E2PROM if the SIM card is phase 1 or from the SIM card if this one is phase 2.

Application to GSM	AT+CRES	<i>Restore</i>
GSM to application	OK	<i>command correct</i>

5.7. Show text Mode Parameters+CSDH

This command gives more information in text mode result codes. These information's are in brackets in commands +CMTI,+CMT,+CDS,+CMGR,+CMGL.

Application to GSM	AT+CSDH?	<i>Current value</i>
GSM to application	+CSDH: 0 OK	<i>do not show header values</i>

5.8. Select TE character set +CSCS

This commands informs the ME which character set is used by the TE. ME is then able to convert character strings correctly. This is used for commands +CMGS in text mode.

Application to GSM	AT+CSCS="GSM"	<i>GSM default alphabet</i>
GSM to application	OK	<i>Command valid</i>
Application to GSM	AT+CSCS="PCCP437"	<i>PC character set Code Page 437</i>
GSM to application	OK	<i>Command valid</i>

5.9. New message indication +CNMI

This command selects the procedure how receiving the message from the network. The application must send the following command :

AT+CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>

<mode> (controls the processing of unsolicited result codes):

- 0: Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
- 1: Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE.
- 2: Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward them directly to the TE.
- 3: Forward unsolicited result codes directly to the TE. TA-TE link specific inband used to embed result codes an data when TA is in on-line data mode.

<mt> (sets the result code indication routing for SMS-DELIVERs):

- 0: No SMS-DELIVER indications are routed-
- 1: SMS-DELIVERs are routed using unsolicited code:
+CMTI: «SM» <index>
- 2: SMS-DELIVERs (except class 2 messages) are routed using unsolicited code:
+CMT: <pdu> (if PDU mode chosen)
or
+CMT
<oa>, <scts> [<tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>]<CR><LF><data>
- 3: Class 3 SMS-DELIVERs are routed directly using code in <mt>=2;
Message of other classes result in indication <mt>=1

<bm>: set the rules for storing received CBMs Types depend on ist coding scheme, the setting of Select CBM Types (+CSCB commands) and <bm>.

- 0: No CBM indications are routed to the TE.
- 1: New CBMs are routed directly to the TE using unsolicited result code
 +CBM: <length><CR><LF><pdu> (PDU mode)
 or
 +CBM:<sn>, <mid>, <dc>, <page>, <pages><CR><LF><data> (Text mode)

<ds> (for SMS-STATUS-REPORTs):

- 0: No SMS-STATUS-REPORTs are routed.
- 1: SMS-STATUS_REPORTs are routed using unsolicited code:
 +CDS: <pdu> (if PDU mode chosen)
 or
 +CDS: <fo>, <mr>, [<ra>, <tora>], <scts>, <dt>, <st>

<bfr>

- 0: TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes)
- 1: TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

Examples:

Application to GSM	AT+CNMI=0,1,0,0,0	<mt>=1
GSM to application	OK	
GSM to application	+CMTI : « SM », 1	<i>Message received</i>
Application to GSM	AT+CNMI=0,2,0,0,0	<mt>=2
GSM to application	OK	
GSM to application	+CMT : "123456", "13/01/96 12h30m00s", 129,4,32,240, "15379", 129, 5<CR><LF> HELLO	<i>Message received</i>
Application to GSM	AT+CNMI=0,0,0,1,0	<ds>=1
GSM to application	OK	

Application to GSM	AT+CMGS="+491710780123"<CR> Hello, how are you ?^Z	<i>Send a message in text mode</i>
GSM to application	+CMGS: 116 OK	<i>Successful transmission</i>
GSM to application	+CDS:2,116+491713456789", 145,"13/01/96 12h30m00s","14/01/96 20h51m05s",16	

5.10. Read message +CMGR

This command allows the application to read incoming stored messages.

AT+CMGR=<index>

+CMGR=<stat>,<oa>,<scts>[,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data> (for SMS-DELIVER only)

This command is also available in PDU mode.

+CMGR=<stat>,<length><CR><LF><pdu>

Example :

GSM to application	+CMTI: "SM",1	<i>New message received</i>
Application to GSM	AT+CMGR=1	<i>read the message</i>
GSM to application	+CMGR: "REC UNREAD", "43322449"<CR> To be or not to be! OK	
Application to GSM	AT+CMGR=1	<i>read again the message</i>
GSM to application	+CMGR: "REC READ", "43322449",20<CR> To be or not to be! OK	
Application to GSM	AT+CMGR=2	<i>read + bad index</i>
GSM to application	+CMS ERROR: 321	<i>error : invalid index</i>
Application to GSM	AT+CMGR=1	<i>in PDU mode</i>
GSM to application	+CMGR: "REC READ", <length><CR><LF><pdu> OK	

5.11. List message +CMGL

This command allows the application to read stored messages, by indicating the type of the message to read. The syntax of this command is: AT+CMGL=<stat>

<stat> (status of message in memory) :

- 0: "REC UNREAD" (received unread message)
- 1: "REC READ"(received read message)
- 2: "STO UNSENT"(stored unsent message)
- 3: "STO SENT"(stored sent message)
- 4: "ALL"(all messages)

The use of "ALL" instead of 4 is also possible for <stat>

+CMGL=<index>,<stat>,<da/oa>[,<alpha>,<scts>,<tooa/toda>,<length>]
<CR><LF><data>

This command is also available in PDU mode.

+CMGL=<index>,<stat>,<length><CR><LF><pdu>

Examples :

Application to GSM	AT+CMGL=0	<i>read the message</i>
GSM to application	+CMGL: 1, "REC UNREAD", "43322449"<CR> To be or not to be! +CMGL: 3, "REC UNREAD", "46290800"<CR> Be happy! OK	
Application to GSM	AT+CMGL=1	<i>read again the message</i>
GSM to application	+CMGL: 2, "REC READ", "43322449",20<CR> Keep cool OK	
Application to GSM	AT+CMGL=2	<i>read + bad index</i>
GSM to application	+CMS ERROR: 321	<i>error : invalid index</i>

5.12. Send message +CMGS

The <address> field is the address of the terminal network to whom the message is sent. To send the message, simply type <ctrl-Z> character (ASCII 26). The text can contain all existing character except <ctrl-Z> and <ESC> (ASCII 27)-

This command is abortable using the <ESC> character when entering text.

In PDU mode, only hexadecimal characters are used ('0'...'9', 'A'...'F').

Example of use :

Application to GSM	AT+CMGS="+491717653421"<CR> Hello, how are you ?^Z	<i>Send a message in text mode</i>
GSM to application	+CMGS : <mr> OK	<i>Successful transmission</i>
Application to GSM	AT+CMGS=<length><CR> <pdu>^Z	<i>Send a message in PDU mode</i>
GSM to application	+CMGS : <mr> OK	<i>Successful transmission</i>

The message reference <mr> which is returned back to the application is allocated by the GSM module. This number begins with 0 and is incremented by one for each outgoing message (successful and failure case) ; it is cyclic on one byte (0 follows 255).

Note : this number is not a storage number - outgoing messages are not stored.

5.13. Set Text Mode Parameters +CSMP

This command shall be used to select value for the <vp>, <pid>, the <dcs>. The application must send the following command :

AT+CSMP=<fo>, <vp>, <pid>,<dcs>

In text mode <vp> is coded only in "relative" format. The default value is 167 (24 hours). This means that one octet can describe different values:

<pid> is used to indicate the higher layer protocol being used or indicates interworking with a certain type of telematic device. For example, 0x22 is for group 3 telefax, 0x24 is for voice telephone, 0x25 is for ERMES.

<dcs> is used to determine the way the information is encoded. UCS2 alphabet and compressed text are not supported. Only GSM default alphabet and 8 bit data are supported.

Application to GSM	AT+CSMP?	<i>current values</i>
GSM to application	+CSMP: 0,0,0,0 OK	<i>no validity period dcs = PCCP437 alphabet (8 bits -> 7 bits)</i>
Application to GSM	AT+CSMP=16,32,64,244	<i>validity period = 32 dcs = GSM 8 bits alphabet</i>
GSM to application	OK	<i>command correct</i>

5.14. Delete message +CMGD

This command shall be used after a read-command in order to delete the received stored message.

For example :

GSM to application	+CMTI: "SM",3	<i>New message received</i>
Application to GSM	AT+CMGR=3	<i>Read it</i>
GSM to application	+CMGR: "REC UNREAD", "43322449",20<CR> To be or not to be! OK	
Application to GSM	AT+CMGD=3	<i>Delete it</i>
GSM to application	OK	<i>SM is deleted</i>

5.15. Service center address +CSCA

This command shall be used to indicate to which service center the message has to be sent.

The GSM module has no default value for this address. If the application tries to send a message without having indicated the service center address, an error will be generated.

So, the application has to indicate this address at initialization. This address is then valid all the time. The application may change it if needed.

For example, let us suppose that no AT+CSCA has been already sent.

Application to GSM	AT+CMGS="+4917178987212"<CR> Hello, how are you ?^Z	<i>Send a message</i>
GSM to Application	+CMS ERROR : 330	<i>Service center unknown</i>
Application to GSM	AT+CSCA="+491710760000 "	<i>Service center initialization for Service center D2: +491722270000 Please ask for other Service centers your local GSM operator or your FALCOM distributor</i>
GSM to application	OK	
Application to GSM	AT+CMGS="+491713321267"<CR> Hello, how are you ?^Z	<i>Send again the same message</i>
GSM to application :	+CMGS : 1	<i>Successful transmission</i>

	OK	
--	----	--

5.16. Select Cell Broadcast Message Types +CSCB

Syntax: AT+CSCB=<mode>, [<mids>, [<dcss>]

Set command selects which types of CBMs are to be received by the ME, This command is allowed in PDU mode only (AT+CMGF=0) with <bm>=2 in AT+CNMI command (ex : AT+CNMI=2,2,2).

Test command (AT+CSCB ?) returns supported <mode> values as a compound value.

The activation of CBM reception (<mode>=0) can select only specific Message Identifiers (list in <mids>) for specific Languages (list in <dcss>), but the deactivation stops any reception of CBMs (only AT+CSCB=1 is allowed)

Message Identifiers (<mids> parameter) indicates which type of message identifiers the ME should listen to.

Supported languages (<dcss> parameter) are : 0 for German, 1 for English, 2 for Italian, 3 for French, 4 for Spanish, 5 for Dutch, 6 for Swedish, 7 for Danish, 8 for Portugese, 9 for Finnish, 10 for Norwegian, 11 for Greek, 12 for Turkish, 13 for Hungarian, 14 for Polish and 32 for Czech.

Application to GSM	AT+CSCB=0,"15-17,50,86", ""	<i>Accept SMS-CB types 15,16,17,50 and 86 in any language</i>
GSM to Application	OK	<i>CBMs can be received</i>
Application to GSM	+CBM : 10<CR><LF> 00112233445566778899	CBM length of a received CB message, CBM bytes in PDU mode
GSM to application	AT+CSCB=1	Deactivate the reception of CBMs
Application to GSM	OK	<i>CBM reception is completely stopped</i>

6. AT commands for Supplementary Services

6.1. Call forwarding +CCFC

This commands allows control of the call forwarding supplementary service. The command to manage this functionality is :

AT+CCFC=<reason>,<mode>[, <number>]

* <reason> :

- 0: Unconditional
- 1: mobile busy
- 2: no reply
- 3: not reachable
- 4: all call forwarding
- 5: all conditional call forwarding

* <mode> :

- 2: Interrogate
- 3: Registration
- 4: Erasure

Application to GSM	AT+CCFC=0,3,146290800	<i>register call forwarding unconditional</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CCFC=0,2	<i>interrogate call forwarding unconditional</i>
GSM to application	+CCFC=1,7,146290800 OK	<i>call forwarding active</i>
Application to GSM	AT+CCFC=0,4	<i>erase call forwarding unconditional</i>
GSM to application	OK	<i>command valid</i>

6.2. Call barring +CLCK

This commands allows control of the call barring supplementary service. The command to manage this functionality is :

AT+CLCK=<fac>,<mode>,<password>

<fac> :see 4.10 chapter

“AO”, “OI”, “OX” for outgoing calls barring
 “AI”, “IR” for incoming calls barring
 “AG”, “AC”, “AB” for all calls barring (<mode>=0 only)

<mode>

- 0: Unlocks the facility
- 1: Locks the facility

Password code must be on 4 digits maximum.

Application to GSM	AT+CLCK="AO",1,1234	
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CLCK="AO",0,5555	
GSM to application	+CME ERROR: 16	<i>wrong password</i>
Application to GSM	AT+CLCK="AO",0,1234	
GSM to application	OK	<i>command valid</i>

6.3. Modify SS password +CPWD

This command shall be used by the application to change the supplementary service password. The command to manage this functionality is :

AT+CPWD=<fac>,<oldpassword>, <newpassword>

for <fac> see +CLCK command.

Application to GSM	AT+CPWD="AO",1234,5555	<i>change password</i>
GSM to application	OK	<i>Password was good</i>
Application to GSM	AT+CPWD="AO",1234,5555	<i>Change password</i>
GSM to application	+CME ERROR: 16	<i>password wrong</i>
Application to GSM	AT+CPWD="AO",5555,1234	<i>change password</i>
GSM to application	OK	<i>Password was good</i>

6.4. Call waiting +CCWA

This command allows control of the call waiting supplementary service. The module supports only one communication. If a call waiting call happens, the module will disconnect it.

The command to manage this functionality is :

AT+CCWA=<n>,<mode>[, <class>]

* <n> : (result code presentation status in the TA)

0: Disable
1: Enable

* <mode> :

0: Disable
1: Registratio
2: Interrogate

* <class> :

1: Voice
2: Data
4: fax

Application to GSM	AT+CCWA=1,1	<i>enable call waiting</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CCWA=1,2	<i>interrogate call forwarding unconditional</i>
GSM to application	+CCWA="x",7 OK	"x" = 1 active "x" = 0 not active
GSM to application	RING +CCWA: +146290800,145,7 NO CARRIER	<i>incoming call</i> <i>number of the incoming call</i> <i>incoming call is disconnected</i>
Application to GSM	AT+CCWA=1,0	<i>erase call waiting</i>
GSM to application	OK	<i>command valid</i>

6.5. Calling line identification restriction +CLIR

This command allows control of the calling line identification restriction supplementary service.

AT+CLIR=<n>

* <n> : parameter sets the adjustment for outgoing calls

- 0: set presentation indicator according to the subscription of the CLIR service
- 1: CLIR invocation
- 2: CLIR suppression

*<m> : parameter shows the subscriber CLIR service status in the network

- 0: CLIR not provisioned
- 1: CLIR provisioned
- 2: Unknown (no network)

Application to GSM	AT+CLIR=2	
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CLIR?	<i>Ask for current functionality</i>
GSM to application	+CLIR: <n>,"y" OK	<i><n> and <m> defined as above</i>

6.6. Calling line identification presentation +CLIP

This command allows control of the calling line identification presentation supplementary service : AT+CLIP=<n>

* <n> : (result code presentation status in the TA)

- 0: disable
- 1: Enable

*<m> : parameter shows the subscriber CLIP service status in the network

- 0: CLIP not provisioned
- 1: CLIP provisioned
- 2: Unknown (no network)

Application to GSM	AT+CLIP=1	<i>Enable CLIP</i>
GSM to application	OK	<i>CLIP is enabled</i>
Application to GSM	AT+CLIP?	<i>ask for current functionality</i>
GSM to application	+CLIP: <n>, <m> OK	<i><n> and <m> defined as above</i>
GSM to application	RING +CLIP: 146290800,145	<i>incoming call</i>

Application to GSM	AT+CLIP=0	<i>Disable CLIP</i>
GSM to application	OK	<i>command valid</i>

6.7. Connected line identification presentation **+COLP**

This command allows control of the connected line identification presentation supplementary service.

AT+COLP=<n>

* <n> : (result code presentation status in the TA)

0: disable

1: Enable

*<m> : parameter shows the subscriber COLP service status in the network

0: COLP not provisioned

1: COLP provisioned

2: Unknown (no network)

Application to GSM	AT+COLP=1	<i>Activate COLP</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+COLP?	<i>ask for current functionality</i>
GSM to application	+COLP: 1, <m> OK	<i><m> as defined above</i>
Application to GSM	ATD 01719045671;	<i>outgoing call</i>
GSM to application	+COLP: 146290928,145 OK	<i>Connected outgoing line presentation</i>
Application to GSM	AT+COLP=0	<i>Desactivate COLP</i>
GSM to application	OK	<i>command valid</i>

7. AT commands for data

7.1. Bearer type selection +CBST

The syntax of the command is AT+CBST=<speed>,0,<ce>

The selection of the bearer impacts both incoming and outgoing calls. No data compression is provided and only asynchronous modem is supported.

<speed>	Description	Modem type
0:	Autobauding	None
1:	300 bps	V.21
2:	1200bps	V.22
3:	1200/75 bps	V.23
4:	2400 bpsV32	V.22bis
5:	2400 bps	V.26ter
6:	4800 bps	V.32
7:	9600 bps	V.32
8:	Specific	
65(*):	300 bps	V.110
66(*):	1200 bps	V.110
68:	2400 bps	V.110
70:	4800 bps	V.110
71:	9600 bps	V.110

*() Only for non transparent mode

<ce>: connection element
 0: Transparent only
 1: Non transparent only
 100: Transparent preferred
 101: Non transparent preferred

Application to GSM	AT+CBST=7,0,1	<i>ask for a bearer</i>
GSM to application	OK	<i>bearer supported</i>
Application to GSM	AT+CBST=81,0,0	<i>ask for a bearer</i>
GSM to application	+CME ERROR : 4	<i>bearer not supported</i>

7.2. Report control **+CR, +CRC**

7.2.1. Outgoing call **+CR**

This command enables a more detailed service reporting, in case of data outgoing call. Before sending the CONNECT response to the application, the GSM module will precise the type of data connection that have been established.

These report types are :

+CR: ASYNC	For asynchronous transparent
+CR: REL ASYNC	For asynchronous non-transparent

Application to GSM	AT+CR=0	<i>extended reports disabled</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CR=1	<i>extended reports enabled</i>
GSM to application	OK	<i>command valid</i>

Default value is stored in E2PROM.

7.2.2. Incoming call **+CRC**

This command enables a more detailed ring indication, in case of incoming call (voice or data). Instead of the string "RING", an extended string is used to indicate which type of call is ringing (e.g. +CRING:VOICE).

These extended indications are :

+CRING: ASYNC	for asynchronous transparent
+CRING: REL ASYNC	for asynchronous non-transparent
+CRING: VOICE	for normal speech.
+CRING : FAX	for fax calls

Application to GSM	AT+CRC=0	<i>extended reports disabled</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CRC=1	<i>extended reports enabled</i>
GSM to application	OK	<i>command valid</i>

Default value is stored in E2PROM.

7.3. Incoming Call Bearer +CICB

This command is used for incoming call type when no bearer is given.
The supported modes are: 0 for data, 1 for fax and 2 for a speech call.

Application to GSM	AT+CICB=1	<i>If no incoming bearer, it is a fax call</i>
GSM to Application	OK	<i>Command accepted</i>
Application to GSM	AT+CICB=2	<i>If no incoming bearer, it is a speech call</i>
	OK	<i>Command accepted</i>

7.4. Echo E

Determines whether the mobile echoes (sends) the commands you enter to your computer screen as you type them..

Application to GSM	ATE0	<i>no local echo</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	ATE1	<i>local echo</i>
GSM to application	OK	<i>command valid</i>

7.5. Result code suppression Q

Determines whether the mobile sends result codes or not

Application to GSM	ATQ0	<i>DCE transmits result codes</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	ATQ1	<i>Result codes are suppressed and not transmitted</i>
GSM to application	(none)	<i>no response</i>

7.6. Fixed DTE rate +IPR

This commands specifies the data rate at which the DCE will accept commands.

Application to GSM	AT+IPR?	
GSM to application	+IPR: 9600 OK	<i>current rate is 9600 bps</i>
Application to GSM	AT+IPR=?	
GSM to application	+IPR:((2400,9600,19200,38400,57600,11520 0) OK	<i>possible values. No autodectable rate supported</i>
Application to GSM	AT+IPR=38400	
GSM to application	OK	<i>new rate is 38400 bps</i>

7.7. Back to online mode O

If you have established a connection and the mobile is in online command mode, this command allows to return to online data mode.

Application to GSM	ATO	
GSM to application	OK	<i>command valid</i>

7.8. DCE response format V

Determines the DCE response format, with or without header characters <CR><LF>, and with the use of numeric result codes.

	V0	V1
Information responses	<text><CR><LF>	<CR><LF> <text><CR><LF>
Result codes	<numeric code><CR>	<CR><LF> <verbose code><CR><LF>

Application to GSM	ATV0	<i>DCE transmits limited headers and trailers and numeric result codes</i>
GSM to application	0	<i>command is valid (0 means OK)</i>
Application to GSM	ATV1	<i>DCE transmits full headers and trailers and verbose</i>

		<i>response text</i>
GSM to application	OK	<i>command is valid</i>

7.9. DTE-DCE character framing +ICF

This command is used to determine the local serial port start-stop (asynchronous) character framing that the DCE shall use.

AT+ICF=<format>,<parity>

* <format> :

0:	Autodetect	not supported
1:	8 Data 2 Stop	not supported
2:	8 Data 1 Parity 1 Stop	not supported
3:	8 Data 1 Stop	supported
4:	7 Data 2 Stop	not supported
5:	7 Data 1 Parity 1 Stop	not supported
6:	7 Data 1 Stop	not supported

* <parity> :

0:	Odd	not supported
1:	Even	not supported
2:	Mark	not supported
3:	Space	not supported
4:	None	supported

Application to GSM	AT+ICF?	
GSM to application	+ICF: 3,4 OK	<i>current values</i>
Application to GSM	AT+ICF=?	
GSM to application	+ICF: (1-6),(0-4) OK	<i>possible values.</i>
Application to GSM	AT+ICF=0,0	
GSM to application	OK	<i>new values</i>

7.10. Repeat last command A/

Application to GSM	A/	<i>repeat last command</i>
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7.11. Default configuration Z

Restores the configuration profile.

Application to GSM	ATZ	
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GSM to application	OK	<i>command valid</i>
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7.12. DTE-DCE local flow control +IFC

This command is used to control the operation of local flow control between the DTE and DCE.

AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>

* < DCE_by_DTE > :

0:	None	not supported
1:	Xon/Xoff local circuit 103	not supported
2:	RTS	supported
3:	Xon/Xoff global on circuit 103	not supported

* < DTE_by_DCE > :

0:	None	not supported
1:	Xon/Xoff circuit 104	not supported
2:	CTS	supported

Application to GSM	AT+IFC?	
GSM to application	+IFC: 2,2 OK	<i>current values</i>
Application to GSM	AT+IFC=?	
GSM to application	+IFC: (2),(2) OK	<i>possible values.</i>
Application to GSM	AT+IFC=0,0	
GSM to application	OK	<i>new values</i>

7.13. Set DCD signal &C

This commands controls the Data Carrier Detect (DCD) signal.

Application to GSM	AT&C0	<i>DCD always on</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT&C1	<i>DCD matches state of the remote modem's data carrier</i>
GSM to application	OK	<i>command valid</i>

7.14. Set DTR signal &D

This commands controls the Data Terminal Ready (DTR) signal.

Application to GSM	AT&D0	<i>The DTR signal is ignored</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT&D1	<i>Modem switches from data to command mode when DTR switches from on to OFF</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT&D2	<i>Upon DTR switch from on to OFF, the call is clear down</i>
GSM to application	OK	<i>command valid</i>

7.15. Set DSR signal &S

This commands controls the Data Set Ready (DSR) signal.

Application to GSM	AT&S0	<i>DSR always on</i>
GSM to application	OK	<i>Command valid</i>
Application to GSM	AT&S1	<i>DSR off in command mode, DSR on in data mode</i>
GSM to application	OK	<i>Command valid</i>

7.16. Save configuration &W

This commands writes the active configuration to nonvolatile RAM.

Application to GSM	AT&W	<i>Writes current configuration to E2prom</i>
GSM to application	OK	<i>Command valid</i>

7.17. Radio link protocol parameters +CRLP

This command allows to change the radio link protocol parameters used for non transparent data transmission.

AT+CRLP=<up-window size>,<down-window size>,<acknowledgement timer>,<retransmission attempts>,<reset allowed>

Application to GSM	AT+CRLP=10,10,90,10,0	<i>set new parameters</i>
GSM to application	OK	<i>command valid</i>
Application to GSM	AT+CRLP?	<i>current values</i>
GSM to application	AT+CRLP: 10,10,90,10 OK	<i>command valid</i>

8. Other AT commands

8.1. V.25 ter recommendation

All the remaining basic commands are implemented in FUNKANLAGEN LEIPOLDT OHG's AT parser. An "OK" string will be sent back but no further software treatment will happen.

All commands about modulation control, error control and data compression are not recognized. An "ERROR" string will be sent back.

8.2. GSM 07.05 recommendation

All the remaining commands are not implemented, so an "ERROR" string will be sent back

8.3. GSM 07.07 recommendation

All the remaining commands are not implemented, so an "ERROR" string will be sent back.

9. Failure result codes

9.1. Report Mobile Equipement errors +CMEE

This command disables or enables the use of result code
+CME ERROR : <xxx> or +CMS ERROR :<xxx>

Application to GSM	AT+CMEE=0	disable « +CME ERROR : <xxx> » and use « ERROR » instead
GSM to application	OK	
Application to GSM	AT+CMEE=1	enable « +CME ERROR : <xxx> »
GSM to application	OK	

9.2. Extended error report +CEER

If the last call setup (originating or answering) fails, this command gives
the reason of the call release.

Application to GSM	ATD123456789 ;	outgoing voice call
GSM to application	NO CARRIER	
Application to GSM	AT+CEER	ask for reason of release
GSM to application	+CEER : Error <xxx> OK	<xxx> is the cause information element values from GSM recommendation 04.08

The cause information element from GSM 04.08 is given below.

9.3. Mobile equipment error result code : +CME ERROR: xxx

<error> is defined as below :

0:	Phone failure
3:	Operation not allowed
4:	Operation not supported
10:	SIM not inserted
11:	SIM PIN required
12:	SIM PUK required
13:	SIM failure
16:	Incorrect password
22:	Not found
24:	Text string too long
26:	Dial string too long
30:	No network service
256:	protocol stack bad state
257:	Bad cell (not in the synchronized ones
258:	Lost cell (due to DSF...)

9.4. Message service failure result code: +CMS ERROR :<er>

<er> is defined as below :

1 to 127:	error cause values from the GSM recommendation 04.11 Annex E-2
301:	SMS service of ME reserved
302:	operation not allowed
303:	operation not supported
305:	invalid text mode parameter
313:	SIM failure
321:	Invalid memory index
322:	SIM memory full
330:	SC address unknown

Error cause values from GSM 04.11 are given below.

9.5. Cause information element values from GSM recommendation 04.08

Cause value	Diagnostic
1:	Unassigned (unallocated) number
3:	No route to destination
6:	Channel unacceptable
8:	Operator determined barring
16:	Normal call clearing
17:	User busy
18:	No user responding
19:	User alerting, no answer
21:	Call rejected
22:	Number changed
26:	Non selected user clearing
27:	Destination out of order
28:	Invalid number format (incomplete number)
29:	Facility rejected
30:	Response to STATUS ENQUIRY
31:	Normal, unspecified
34:	No circuit/channel available
38:	Network out of order
41:	Temporary failure
42:	Switching equipment congestion
43:	Access information discarded
44:	requested circuit/channel not available

47:	Resources unavailable, unspecified
49:	Quality of service unavailable
50:	Requested facility not subscribed
55:	Incoming calls barred with in the CUG
57:	Bearer capability not authorized
58:	Bearer capability not presently available
63:	Service or option not available, unspecified
65:	Bearer service not implemented
68:	ACM equal to or greater than ACMmax
69:	Requested facility not implemented
70:	Only restricted digital information bearer capability is available
79:	Service or option not implemented, unspecified
81:	Invalid transaction identifier value
87:	User not member of CUG
88:	Incompatible destination
91:	Invalid transit network selection
95:	Semantically incorrect message
96:	Invalid mandatory information
97:	Message type non-existent or not implemented
98:	Message type not compatible with protocol state
99:	Information element non-existent or not implemented
100:	Conditional IE error
101:	Message not compatible with protocol state
102:	Recovery on timer expire
111:	Protocol error, unspecified

127:	Interworking, unspecified
252:	Call barring on outgoing calls
253:	Call barring on incoming calls
254:	Call impossible
255:	Lower layer failure

**All other values in the range 0 to 31 shall be treated as cause 31.
All other values in the range 32 to 47 shall be treated as cause 47.
All other values in the range 48 to 63 shall be treated as cause 63.
All other values in the range 64 to 79 shall be treated as cause 79.
All other values in the range 80 to 95 shall be treated as cause 95.
All other values in the range 96 to 111 shall be treated as cause 111.
All other values in the range 112 to 127 shall be treated as cause 127.**

9.6. GSM 04.11 Annex E-2: Mobile originating SM-transfer

Cause no 1: "Unassigned (unallocated) number"

This cause indicates that the destination requested by the Mobile Station cannot be reached because, although the number is in a valid format, it is not currently assigned (allocated).

Cause no 8: "Operator determined barring"

This cause indicates that the MS has tried to send a mobile originating short message when the MS's network operator or service provider has forbidden such transactions.

Cause no 10: "Call barred"

This cause indicates that the outgoing call barred service applies to the short message service for the called destination.

Cause no 21: "Short message transfer rejected"

This cause indicates that the equipment sending this cause does not wish to accept this short message, although it could have accepted the short message since the equipment sending this cause is neither busy nor incompatible.

Cause no 27: "Destination out of service"

This cause indicates that the destination indicated by the Mobile Station cannot be reached because the interface to the destination is not functioning correctly. The term "not functioning correctly" indicates that a signaling message was unable to be delivered to the remote user; e.g., a physical layer or data link layer failure at the remote user, user equipment off-line, etc.

Cause no 28: "Unidentified subscriber"

This cause indicates that the subscriber is not registered in the PLMN (i.e. IMSI not known)

Cause no 29: "Facility rejected"

This cause indicates that the facility requested by the Mobile Station is not supported by the PLMN.

Cause no 30: "Unknown subscriber"

This cause indicates that the subscriber is not registered in the HLR (i.e. IMSI or directory number is not allocated to a subscriber).

Cause no 38: "Network out of order"

This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g., immediately reattempting the short message transfer is not likely to be successful.

Cause no 41: "Temporary failure"

This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g., the Mobile Station may wish to try another short message transfer attempt almost immediately.

Cause no 42: "Congestion"

This cause indicates that the short message service cannot be serviced because of high traffic.

Cause no 47: "Resources unavailable, unspecified"

This cause is used to report a resource unavailable event only when no other cause applies.

Cause no 69: "Requested facility not implemented"

This cause indicates that the network is unable to provide the requested short message service.

Cause no 81: "Invalid short message transfer reference value"

This cause indicates that the equipment sending this cause has received a message with a short message reference which is not currently in use on the MS-network interface.

Cause no 95: "Invalid message, unspecified"

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause no 96: "Invalid mandatory information"

This cause indicates that the equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (the two cases are indistinguishable).

Cause no 97: "Message type non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a

message not defined or defined but not implemented by the equipment sending this cause.

Cause no 98: "Message not compatible with short message protocol state"

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.

Cause no 99: "Information element non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause no 111: "Protocol error, unspecified"

This cause is used to report a protocol error event only when no other cause applies.

Cause no 127: "Interworking, unspecified"

This cause indicates that there has been interworking with a network which does not provide causes for actions it takes; thus, the precise cause for a message which is being send cannot be ascertained.

9.7. Summary of result codes

Verbose result code	Numeric (V0 set)	Description
+CCCM : <ccm>	as verbose	Current Call Meter value
+CCWA : <nb>,<type>,<class>	as verbose	Call Waiting number
+CLIP : <number>,<type>	as verbose	Incoming Call Presentation
+COLP : <number>,<type>	as verbose	Outgoing Call Presentation
+CR : <type>	as verbose	Outgoing Call report control
+CREG : <stat>	as verbose	Network registration indication
+CRING : <type>	as verbose	Incoming call (VOICE, FAX ...)
BUSY	7	Busy signal detected
CONNECT 300	10	Data connection at 300 bauds

CONNECT 1200	11	Data connection at 1200 bauds
CONNECT 1200/75	12	Data connection at 1200/75 bauds
CONNECT 2400	13	Data connection at 2400 bauds
CONNECT 4800	14	Data connection at 4800 bauds
CONNECT 9600	15	Data connection at 9600 bauds
ERROR	4	Command not accepted
NO ANSWER	8	Connection completion timeout
NO CARRIER	3	Connection terminated
OK	0	Acknowledges execution of a command line
RING	2	Incoming call signal from network

10. Fax management

The firmware you have been provided with includes the fax service (Group3, Class1)

The fax functionalities of this version have been tested and they are fully functional in several countries with the following fax softwares: Delrina Winfax, Trio, MS Winfax, However, the fax functions might work in other countries and with other fax softwares.

10.1. Setting up the module for fax:

The GSM unit as well as the PC fax application have to be properly set up prior to send/receive faxes-

The only thing to do is to change the serial link rate as follows:

- a) Launch any terminal application on PC and set it up to 9600 baud.
- b) It is recommended to set all extended messages of the GSM to 0:

```
AT+CLIR=0
AT+CLIP=0
AT+COLP=0
AT+CR=0
AT+CRC1=0
AT+CMEE=0
```

- c) From the terminal application type in: **AT+IPR=2400; &W<enter>**

The GSM unit should reply OK (if not, type in `AT<enter>` as long as it does not answer `OK` and start again stage b).

10.2. Setting up the PC fax application:

10.2.1. Delrina WinFax v4.0

The recommended fax application is Delrina WinFax v4.0.
It should be configured as follows (menu Setup/Fax Modem Setup):

- Port com 1
- Model: Generic Class 1 (HARDWARE FLOW CONTROL). Above all, do not select «Generic Class 1» (Software flow control).
- Init: clear default string
- Reset: clear default string
- Maximum transmit Rate: 9600 baud.

Other settings are of no interest for the GSM unit: they can be modified.

10.3. Restoring the module default profile for data call

If the module is configured as stated in 1/ then the serial rate is 2400 baud which of course limits the overall throughput in support of 4800/9600 data calls.

Therefore, the serial rate should be set back to 9600 (or better 19200) baud by issuing: **AT+IPR=9600; &W <enter>**

11. General

IMPORTANT

FOR THE EFFICIENT AND SAFE OPERATION OF YOUR GSM MODEM

READ THIS INFORMATION BEFORE USE

Your GSM modem is one of the most exciting and innovative electronic products ever developed. With it you can stay in contact with your office, your home, emergency services, and others, wherever service is provided.

GENERAL

Your modem utilizes the GSM standard for cellular technology. GSM is a newer radio frequency (« RF ») technology than the current FM technology that has been used for radio communications for decades. The GSM standard has been established for use in the European community and elsewhere.

Your modem is actually a low power radio transmitter and receiver. It sends out and receives radio frequency energy. When you use your modem, the cellular system handling your calls controls both the radio frequency and the power level of your cellular modem.

EXPOSURE TO RF ENERGY

There has been some public concern about possible health effects of using GSM modem. Although research on health effects from RF energy has focused for many years on the current RF technology, scientists have begun research regarding newer radio technologies, such as GSM. After existing research had been reviewed, and after compliance to all applicable safety standards had been tested, it has been concluded that the product is fit for use.

If you are concerned about exposure to RF energy there are things you can do to minimize exposure. Obviously, limiting the duration of your calls will reduce your exposure to RF energy. In addition, you can reduce RF exposure by operating your cellular modem efficiently by following the below guidelines.

EFFICIENT MODEM OPERATION

For your modem to operate at the lowest power level, consistent with satisfactory call quality :

If your modem has an extendible antenna, extend it fully. Some models allow you to place a call with the antenna retracted. However your modem operates more efficiently with the antenna fully extended.

Do not hold the antenna when the modem is « IN USE ». Holding the antenna affects call quality and may cause the modem to operate at a higher power level than needed.

ANTENNA CARE AND REPLACEMENT

Do not use the modem with a damaged antenna. If a damaged antenna comes into contact with the skin, a minor burn may result. Replace a damaged antenna immediately. Consult your manual to see if you may change the antenna yourself. If so, use only a manufacturer-approved antenna. Otherwise, have your antenna repaired by a qualified technician.

Use only the supplied or approved antenna. Unauthorized antennas, modifications or attachments could damage the modem and may contravene local RF emission regulations or invalidate type approval.

11.1. GENERAL SAFETY

DRIVING

Check the laws and regulations on the use of cellular devices in the area where you drive. Always obey them. Also, when using your modem while driving, please :

- give full attention to driving,
- pull off the road and park before making or answering a call if driving conditions so require.

ELECTRONIC DEVICES

Most electronic equipment, for example in hospitals and motor vehicles is shielded from RF energy. However RF energy may affect some malfunctioning or improperly shielded electronic equipment.

VEHICLE ELECTRONIC EQUIPMENT

Check your vehicle manufacturer's representative to determine if any on board electronic equipment is adequately shielded from RF energy.

MEDICAL ELECTRONIC EQUIPMENT

Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc...) to determine if they are adequately shielded from external RF energy.

Turn your modem **OFF** in health care facilities when any regulations posted in the area instruct you to do so. Hospitals or health care facilities may be using RF monitoring equipment.

AIRCRAFT

Turn your modem **OFF** before boarding any aircraft.

- Use it on the ground only with crew permission.
- Do not use in the air.

To prevent possible interference with aircraft systems, Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your modem while the plane is on the ground. To prevent

interference with cellular systems, local RF regulations prohibit using your modem whilst airborne.

CHILDREN

Do not allow children to play with your modem. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children could damage the modem, or make calls that increase your modem bills.

BLASTING AREAS

To avoid interfering with blasting operations, turn your unit **OFF** when in a « blasting area » or in areas posted : « turn off two-way radio ». Construction crew often use remote control RF devices to set off explosives.

POTENTIALLY EXPLOSIVE ATMOSPHERES

Turn your modem **OFF** when in any area with a potentially explosive atmosphere. It is rare, but your modem or its accessories could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fueling areas such as petrol stations ; below decks on boats ; fuel or chemical transfer or storage facilities ; and areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

Do not transport or store flammable gas, liquid, or explosives, in the compartment of your vehicle which contains your modem or accessories.

Before using your modem in a vehicle powered by liquefied petroleum gas (such as propane or butane) ensure that the vehicle complies with the relevant fire and safety regulations of the country in which the vehicle is to be used.

11.2. SAFETY STANDARDS

THIS CELLULAR MODEM COMPLIES WITH ALL APPLICABLE RF SAFETY STANDARDS.

This cellular modem meets the standards and recommendations for the protection of public exposure to RF electromagnetic energy established by governmental bodies and other qualified organizations, such as the following :

Directives of the European Community, Directorate General V in Matters of
Radio Frequency Electromagnetic Energy